



SP-F15 Quarterly Progress Update

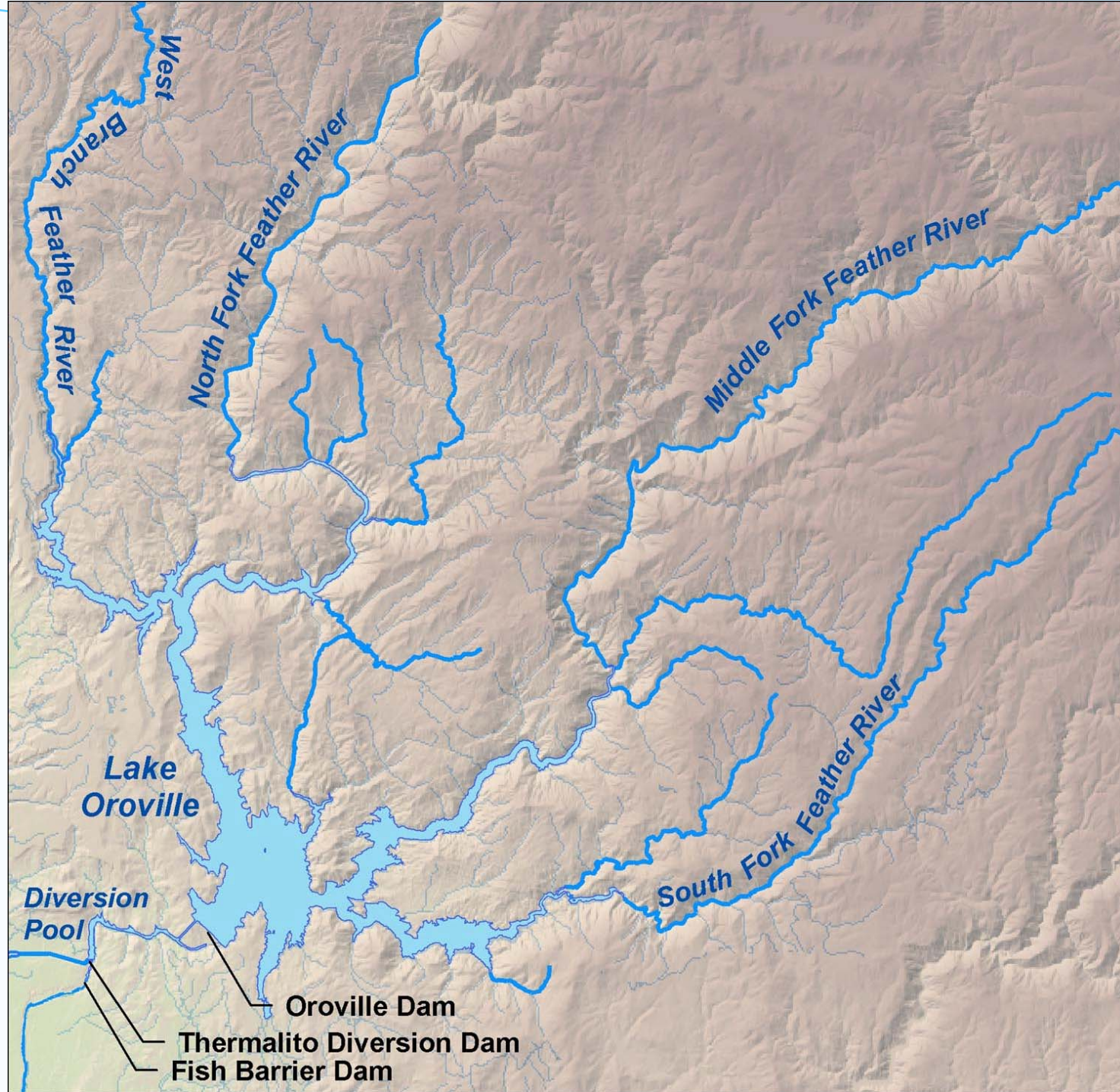
Evaluation of the Feasibility to
Provide Passage for Targeted Species
of Migratory and Anadromous Fish
Past Oroville Facility Dams

Overall Study Objective

- To evaluate feasibility of alternatives to provide passage for migratory and anadromous fish from below the fish barrier dam up to the first upstream fish barrier above Lake Oroville.

Study Area

- Lower Feather River
- Fish Barrier Pool
- Diversion Pool
- Lake Oroville
- Upstream tributaries extending up to the first complete fish migration barriers



SP-F15 Individual Task Objectives

Task 1- Description of Life History and Habitat Requirements of Feather River Anadromous Salmonids and other Migratory Species.

Task 2- Inventory of Potentially Available Habitat for Juvenile and Adult Fish Upstream of Lake Oroville.

Task 3- Evaluation of methods and devices used in the capture, sorting, holding, transport and release of fish.

Task 4- Development of weighted matrix and GIS decision support tool.

Task 1 Objectives

- Define the life history and habitat requirements of anadromous and migratory fish to provide a basis for the evaluation of the suitability of habitat that could potentially be accessed through a fish passage program.

Species Evaluated Under Task 1

- Spring-run Chinook salmon
- Fall-run Chinook salmon
- Steelhead
- Sturgeon
 - Green sturgeon
 - White sturgeon

Task 2

Inventory of Potentially
Available Habitat for Juvenile
and Adult Fish

Task 2 Objectives

Identify and quantify areas that provide suitable habitat for holding, spawning and rearing through the evaluation of biological, hydrologic, and physical habitat requirements of adults and juveniles.

Distinct Geographical Units

- Below Fish Barrier Dam
- Fish Barrier Pool
- Diversion Pool
- Lake Oroville above the Dam
- Oroville Tributaries below Lake Oroville's high water mark
 - West Branch of No. Fork Feather River
 - No. Forth Feather River
 - Middle Fork Feather River
 - South Fork Feather River

Distinct Geographical Units

- Oroville Tributaries below the first fish barrier but above Lake Oroville's high water mark include but are not limited to:
 - Sucker Run Creek
 - West Branch of No. Fork Feather River
 - No. fork Feather River
 - Middle Fork Feather River
 - South Fork Feather River
- Potential locations where juvenile fish could be released downstream of Oroville facilities

Characterizing Fish Habitat

- SP-G1 Mesohabitat – mesohabitat type, substrate, spawning gravel quality, water depth, cover)
- SP-G1 Transect Data – sediment plug characterization, representative upstream transects
- SP-W6 Water Quality – water temperatures, DO
- SP-W1 Water Quality - water quality exceedences
- USGS gauging stations - Flow data
- Reservoir stage elevation records

Characterizing Fish Habitat

- SP-F1 Macroinvertebrate community – Composition and relative abundance
- SP-F2 Fish Diseases – history, types, occurrences
- SP-F3.1 Task 1A – Fish barrier characterization
- SP-F3.1 Task 1B – Fish compositions and snorkel survey results
- SP-F3.1 Task 1C – Fish habitat

Characterizing Fish Habitat

- SP-F5/7 Task 1 – ESA fish species interactions
- SP-F8 Task 1 – Historical salmonid escapement estimate
- SP-F8 Task 2 – Estimate of maximum escapement for available habitat

Upstream Tributary Water Temperatures (SP-W6) vs. Salmonid Lifestage Requirements



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Task 3

Evaluation of Methods and
Devices Used in the Capture,
Sorting, Holding, Transport
and Release of Fish

Task 3 Objectives

- Develop information to support the evaluation of alternatives for passage of anadromous salmonids and migratory fish (sturgeon) past Oroville Dam
- Assess practicalities and general considerations associated with each passage alternative and device

General Passage Considerations

- Exposure of hatchery water supply to fish diseases (would require water treatment or separate water supply for hatchery)
- Increased risks of fish kills in hatchery
- Exposure of reservoir and upstream tributary fisheries to diseases
- Increased cumulative disease pressure throughout the downstream Feather River system
- Reduction in manageability and quality of the reservoir salmonid fisheries

General Passage Considerations

- Recreation impacts
- Traffic impacts
- Political/socioeconomic issue of transferring two threatened species into an area where they do not currently exist
- Potential genetic introgression of steelhead with resident (non-native strains stocked) rainbow trout
- Predation on and from resident fish populations

General Passage Considerations

- Separation of spring-run vs. fall-run Chinook (if they can be reliably differentiated)
- Potential predation impacts on other ESA species (e.g. red legged frog)
- Competition with resident salmonids for food and habitat
- Stress (resulting in reduced productivity) and mortality from capture, sorting, holding, transfer, transport and release of fish

General Passage Considerations

- Potential removal of juvenile rainbow trout from tributaries
- Challenges with recapturing adult steelhead and sturgeon
- Opportunity cost of loss of spawning fish from lower Feather River
- Potential cost of passage program vs. other alternative methods to achieve goals
- Net productivity of the passage program and risks
- Upstream fish nutrient and energy transfer

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General Passage Considerations

- Reduction in redd superimposition and resulting egg mortality in the lower Feather River
- Access to increased quantity (and quality?) of fish spawning habitat
- Access to increased quantity (and quality?) of fish rearing habitat
- Access to habitat conditions more closely approximating historical range

Approach to Passage Phases

- Upstream passage phases: adult capture, sorting, holding, transfer, transport, release
- Downstream passage phases: juvenile capture low flow, juvenile capture high flow, adult capture? (steelhead and sturgeon), holding (separate for adult steelhead and sturgeon), transfer (separate for adult steelhead and sturgeon), transport (separate for adult steelhead and sturgeon), release (separate for adult steelhead and sturgeon)

Approach to Passage Considerations

- Each passage phase requires a review and description of all alternative methods and devices that could potentially be employed
- Case studies/projects where device has been used will be reviewed and device success will be evaluated for applicability to Oroville conditions

Device Review and Description

- General physical requirements necessary for installation, operation and maintenance
- General costs associated with installation, operation and maintenance
- Device efficiency and useful life span
- Operating description and pictures
- Performance standards regarding success/loss rates

Device Review and Description

- Potential impacts associated with device malfunction
- Appropriateness of device for fish species and life stages
- Mechanical capabilities and limitations
- Compliance with agency device approval criteria
- Example projects utilizing the device

Development of Alternatives and Evaluation Criteria

- Adult collection
- Adult transport
- Adult release locations
- Adult recapture (steelhead and sturgeon)
- Juvenile capture – low flow
- Juvenile capture – high flow
- Juvenile sorting and holding
- Juvenile transport
- Juvenile release locations

Example - Juvenile Release Location Considerations

- Habitat availability
- Habitat quality
- Desirability based on fish homing/site fidelity considerations
- Interactions with resident species
 - Predation
 - Disease
 - Competition
 - Food
 - Habitat

Definition of Fish Passage Goals

A refined set of goals for fish passage need to be defined to guide the development and evaluation of passage program alternatives

Potential goals could include (but are not limited to):

- Increased natural production
- Protection or enhancement of genetic stocks

Definition of Fish Passage Program Success

- Measures of success have not been established
 - What will the recovery goal be? (to be defined)
 - How will fish passage success be measured? (number of fish passed, number of captured and released juveniles and number of tagged returns)
 - What level of net fish passage efficiency is acceptable? (number of tagged returns per fish passed – to be determined)
 - What cost per fish passed, juvenile released or tagged return is acceptable? (to be determined)

Using the Experience and Knowledge of Other Facilities

- Columbia River
- Snake River
- Baker River
- Cougar Lake
- Susquehanna River
- Deschutes River
- Shasta Dam passage program assessment

Task 4

Development of weighted
matrix and GIS decision
support tool

Task 4 Objectives

- Describe facility structures and geographic conditions of study area
- Develop a weighted matrix that will rank the feasibility of each alternative
- Develop a GIS decision support tool to facilitate consideration and comparison of various combinations of potential passage programs

	Reach	River Miles	Available Mesohabitat Data (% of Reach)	Riffle Area (sq. feet)	Historical Escapement (# of fish)			River Miles of Yoshiama's Historical Salmonid Spawning
					Low*	High*	Average	
West Branch	In low pool	5.17	0%	0	290	11,234	5,907	5.17
	In high pool	3.96	22%	5,720	222	8,605	4,524	3.96
	From edge of high pool to Miocene Dam	6.23	41%	18,260	349	13,538	7,118	6.23
	Total	15.36	--	23,980	860	33,377	17,549	15.36
North Fork	In low pool	13.23	0%	0	741	28,749	15,115	13.23
	In high pool	8.57	53%	1,260	480	18,623	9,791	8.57
	From edge of high pool to Poe Dam	7.76	0%	0	435	16,862	8,866	7.76
	Total	29.56	--	1,260	1,655	64,234	33,772	29.56
Middle Fork	In low pool	10.88	0%	0	609	23,642	12,430	10.88
	In high pool	4.81	59%	31,740	269	10,452	5,495	3.12
	From edge of high pool to Curtain Falls	2.04	100%	2,300	114	4,433	2,331	0.00
	Total	17.73	--	34,040	993	38,527	20,257	14.00
South Fork	In low pool	4.30	0%	0	241	9,344	4,913	4.30
	In high pool to Ponderosa Dam	3.96	38%	113,163	222	8,605	4,524	3.96
	Total	8.26	--	113,163	463	17,949	9,437	8.26
Total	In low pool	33.58			1,880	72,969	38,365	33.58
	In high pool	21.30			1,193	46,285	24,335	19.61
	From high pool to fish passage barrier	16.03			898	34,833	18,314	13.99
	Total	70.91			3,971	154,087	81,015	67.18

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